

THE HALF-CENTURY TRITIUM RESEARCHES OF NATURAL WATERS IN RUSSIA

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The paper presents the compressed statement of the author's works contained in the book resulted "Tritium researches of natural waters in Russia" (Moscow, GEOS. 2008. 320 p.). It is written on the basis of the authors' original materials of studies for the last half-century concerning the tritium content ($^{1\text{H}}\text{H}^3\text{O}$, or HTO) in natural waters on the territory of the country and in the seas of the World Ocean. The conceptual idea uniting these studies is the singularity of source of atmospheric HTO supplied to hydrosphere, and stochasticity of this process. It is developed a theory of a multicomponent isotope balance method for studying dynamic characteristics of water objects.

The detailed analysis of experimental data has allowed establishing the basic dependences of space-temporal HTO distribution in the meteoric waters of the most part of the Eurasian continent, of the adjacent Russia seas waters and some water areas of the World Ocean, and also in meteoric waters and firn of Antarctica.

It is received the experimental proof of absence of endogenic tritium source in ocean at the expense of its formation at so-called 'the cold' synthesis.

The conclusive proof of legitimacy of HTO use as tracer, having only atmospheric origin is presented at studying circulation of the World Ocean waters.

It is revealed large-scale heterogeneity in distribution of HTO and HDO in the water thickness of the Baikal Lake, testifying to penetration of river waters during one season on big depths that gives the chance for estimations of real pollution of deep waters by industrial drains.

Modeling experiments and calculations of the main effects influencing formation of HTO fields in atmospheric moisture over ocean and pools of underground waters are executed. Prevailing influence of a molecular exchange on the HTO content in the top layer of lakes, the seas and oceans and in the atmospheric moisture over ocean is established. The "shielding" effect of continent on the HTO content in an atmospheric moisture is also established

The study contains priority results of the large-scale researches on tritium use in industry (the oil deposits, collieries, mines, etc.) and in researches under national and international programs (WESTPAC, SOUTHERN OCEAN, etc.)

The large contribution to the problem of protection of the natural environment of Russia are works on creation of the national and Far East regional monitoring systems for control of the natural waters pollution by tritium.

Efficiency of the Far East system for the tritium control has been confirmed by detection of tritium anomalies (with reliability 0,99), caused by transporting of the atmospheric moisture from shooting range Lob Nor from the last (10/16/1980) of atmospheric thermonuclear explosion of the Peoples Republic of China to Far East region. Anomalies have been registered in the atmospheric precipitation and moisture, sampled by stationary, ship and helicopter devices. Transport of an aerosol cloud in the form of two coils round the globe in the Northern hemisphere midlatitudes was revealed.